wherein 2 to 20 times as large amounts of the magnetic layer coating material as the intended magnetic layer-wet thickness is applied onto the magnetic layer by using the die nozzle coating.

9. (new) The process for producing the magnetic recording medium according to claim 7, wherein a solid component concentration of the magnetic layer coating material is 10% by weight or less.

10. (new) The process for producing the magnetic recording medium according to claim 9, which comprises dispersing the magnetic layer coating material again by means of an online dispersion apparatus immediately before applying the magnetic layer coating material onto the non-magnetic layer.

REMARKS

This is a full and timely response to the non-final Official Action mailed March 29, 2002. A petition for a one-month extension of time and the requisite fee are included herewith. Reexamination and reconsideration in light of the above amendments and the following remarks are courteously requested.

By the foregoing amendment, claim 1 has been amended. Basis for the amendment may be found throughout the specification, and particularly at page 24, lines 19 to 20. Additionally, new claims 5 to 10 have been added. Thus, claims 1 to 10 are currently pending for the Examiner's consideration, with claims 1 and 7 being independent claims.

In the Office Action, the Examiner rejected claims 1 to 4 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,207,252 ("Shimomura") in view of U.S. Patent No. 4,332,840 ("Tanake"). These rejections are respectfully traversed.

Claim 1 as amended recites the step of,

> "... scraping excess amounts of the magnetic layer coating material to the intended magnetic layer-wet thickness by means of a wire bar or a non-wire coater bar in which a channel is formed thereon to form a magnetic coating layer.

This method step is neither taught nor suggested by Shimomura or Tanake. Shimomura teaches a method for producing a magnetic recording medium which preferably includes the use of a non-magnetic underlayer that is coated onto a non-magnetic support by way of extrusion. Shimomura fails to teach or suggest the use of a bar to scrape excess amounts of magnetic layer coating material. Shimomura does teach several methods by which the magnetic layer coating material is coated onto a non-magnetic underlayer, and one of those methods is a "blade coating method" (col. 8, lines 18 to 21). However, as will be discussed below, there are well known differences in the pertinent art between reference to a "blade coating method" and a scraping method that involves the use of a bar (claim 1 as filed). There are even further differences between the use of a "blade coating method" and a scraping method where a wire bar or a non-wire coater bar in which a channel is formed thereon.

The Examiner apparently concedes that Shimomura fails to teach the use of a bar to scrape excess coating material from a non-magnetic base layer, but applies Tanaka for this teaching. Tanaka teaches that a magnetic coating material can be scraped to determine the thickness of the material by the use of a "doctor blade" (denoted by reference numeral 9, see col. 4, line 61). The words "blade," "knife," and "bar" have understood differences by a person of ordinary skill in the pertinent art. Tanaka discloses that "the web 4 ... is coated with a magnetic coating liquid 3" and "the web 4 passes over a doctor backing roll 8 at which excessive amounts of coating liquid 3 are removed from the web 4 by a doctor blade 9" (col. 3, lines 10 to 18).

Tanaka's "blade" has an even surface, and the even surface of the blade scrapes and meters the coating liquid. As a natural consequence of this shape, "the doctor blade 9 is arranged in the widthwise direction of the roll 8 in such a manner that the gap between the doctor blade 9 and the roll 8 is uniform" (col. 5, lines 7 to 10). Thus, Tanaka's "blade" must be arranged at a regular gap between the blade and the web to preserve a certain amount of the coating liquid as well as to remove excessive amount of the coating liquid. Further, the backing roll allows the blade to achieve this gap.

In contrast, the present specification and claims recite the use of a wire bar or a non-wire coater bar in which a channel is formed thereon (p. 24, lines 19 to 20). For the Examiner's convenience in understanding the shape and overall structure of these features, filed herewith is a printed web page from http://www.osgnet.com/products/bars which shows two pictures in the lower part of the first page, representing the wire bar used in accordance with the claimed invention. The right-hand picture of these two pictures shows that a space is provided between each of the threads. The other three pictures in the upper and middle parts represent the non-wire coater bar used in accordance with the claimed invention. The non-wire coater bar is represented by the wording, "D-bar" and the right-hand picture of these three pictures shows how a groove is created in the coater bar.

More particularly, the wire bar of the invention as claimed in claim 1 clearly does not have an even surface. The spaces in the wire bar create an uneven surface, and the uneven surface scrapes and meters the coating material. The wire bar is arranged so that the threads of the uneven surface directly touch the non-magnetic layer surface. Because direct contact is made between the wire bar and the non-magnetic surface, it is clear that the teachings of Tanaka are set apart from the present invention, because Tanaka requires that a gap is continuously formed

between the doctor blade and the surface beneath the magnetic layer. Although using the wire bar of the present invention there is direct contact with the non-magnetic layer, there is still a portion of the wire bar where no such contact is made, namely, the portion where the spaces exist between the threads. Thus, the space directly between the non-magnetic layer and the wire bar is completely occupied in some portions by the non-channel regions of the wire bar, and is not occupied in the portions where the channels between the threads exist.

Similarly, the coater bar of the amended claim 1 does not have an even surface, but has an uneven surface that creates a channel. The uneven surface of the coater bar scrapes and meters the coating material. The coater bar is arranged so that the projected portions of the uneven surface directly touch the non-magnetic layer surface, in contrast to the gap created by the Tanaka doctor blade. The coater bar does not completely occupy the space between the non-magnetic layer and the coater bar because the groove or channel regions between the projected portions do not occupy that space.

Because it is unnecessary to create a gap between the non-magnetic layer and the wire bar or the coater bar, the present invention eliminates the backing roll, which is indispensable under the teachings of Tanaka. Further, from the above discussion it is clear that Tanaka fails to teach or suggest the presently claimed use of a wire bar or a channeled coater bar. "To establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. In re Royka, 490 F.2d 981, 180 USPQ 580 (CCPA 1974)." M.P.E.P. § 2143.03. Accord. M.P.E.P. § 706.02(j). Consequently, it is respectfully requested that the rejections of claims 1 to 4 be withdrawn.

It is further pointed out that by scraping excess amounts of material, leaving the small amount of coating material in the unoccupied space, and by leveling off the remaining material to

form the magnetic layer, the layer is able to be metered by use of the wire bar or coater bar to produce an extremely thin magnetic layer with a thickness of 0.02 to 0.08 μm. Newly added claim 5 recites that the range of the dry thickness of the magnetic layer is between 0.02 to 0.08 μm. Tanaka teaches a process that produces a magnetic tape having a magnetic layer with a thickness of 3 to 10 μm (see experiments at column 7, Table 2). In contrast, the present invention discloses an "extremely thin" magnetic layer" with a thickness of 0.02 to 0.08 μm (see page 26, line 22 to page 27, line 1). There is more than two orders of difference between the thickness of these magnetic layers of Tanaka and the present invention. Therefore, even if Tanka's method were applied in the present invention, a magnetic medium having an extremely thin magnetic layer of a thickness between 0.02 and 0.08 μm would not be produced. This remarkable effect is brought about by the use of the wire bar or channeled coater bar claimed and discussed above.

It is further pointed out that Tanaka fails to disclose a non-magnetic layer, so the magnetic layer is directly formed on a support film. Without the intervention of the lower non-magnetic layer, a surface roughness of a support film is directly revealed in the magnetic surface. The backing roll of the Tanaka process also influences the magnetic surface because of its surface roughness. From the above, it is clear that the magnetic layer with excellent smoothness and an extreme thinness would not be produced by the Tanaka method.

It is incidentally pointed out that Shimomura discloses that the thickness of the magnetic layer is 0.7 μm or thinner (claim 1), preferably 0.5 μm or thinner, and more preferably 0.3 μm or thinner (col. 3, lines 7 to 10). The range of 0.3 or thinner disclosed by Shimomura could, at first notice, be thought to include layers so small that the range of new claim 5 is anticipated. However, it is well-established law that "[i]n order to render a claimed apparatus or method [of a

patent application] obvious, the prior art must enable one skilled in the art to make and use the apparatus or method [of the patent application]." Beckman Instruments, Inc. v. LKB Produkter AB, 892 F.2d 1547, 1551, 13 U.S.P.Q.2d 1301, 1304 (Fed. Cir. 1989); In re Payne, 606 F.2d 303, 314, 203 U.S.P.Q. 245, 255 (CCPA 1979). Shimomura does not provide any examples that produce a magnetic layer ranging between 0.02 and 0.08 μm, and such a range could not be accomplished using the teachings of Shimomura. Therefore, Shimomura's teachings would not enable a person of ordinary skill in the art to reach the claimed features of claim 5.

Incidentally, the features of claim 6 would not be obvious for the same reasons described below.

Newly added independent claim 7 recites the process of curing the non-magnetic layer, which takes place following the step of drying the non-magnetic layer. Although Shimomura teaches some of the same solid components as well as resin components that are disclosed in the present application (col. 6, lines 48 to 54, col. 7, lines 22 to 43), Shimomura fails to teach that the resin in the non-magnetic underlayer is radiation-cured. Shimomura only teaches that the resins are "sufficiently dried" but not radiation-cured prior to the addition of the magnetic layer. The curing step of the present invention prevents the non-magnetic layer from swelling due to a solvent in that material, and the curing process gives the magnetic layer a remarkably smooth surface. The remarkable effects of the surface smoothness allows for the magnetic layer to be extremely thin, and these effects are supported by the Examples of the present specification.

As mentioned above, the Shimomura reference fails to teach or suggest the remarkable effects of a curing process followed by applying a magnetic coating material. Incidentally, Tanaka fails to teach the non-magnetic layer in any respect whatsoever. Thus, the features of claims 6 and 7 are not obvious over the Shimomura and Tanaka references.

The Examiner merely asserts that the features of claims 2 to 4 are "conventional" without citing any passages from any references to support this assertion. It is respectfully requested that the Examiner cite some support for these assertions regarding claims 2 to 4. Claim 4 particularly includes features that do not appear to be taught or suggested by either Shimomura or Tanaka. Shimomura does teach that a dispersion agent can be added to the materials that form a magnetic film, but neither of the prior art references applied against the claims include an online dispersion apparatus, acting immediately before the application of the magnetic layer coating material. Claim 2 also recites a range of excess magnetic coating material that is clearly not taught or suggested by the prior art.

For the foregoing reasons, all the claims now pending in the present application are believed to be clearly patentable over the prior art of record. Accordingly, favorable reconsideration of the claims in light of the above remarks is courteously solicited. If the Examiner has any comments or suggestions that could place this application in even better form, the Examiner is requested to telephone the undersigned attorney at the below-listed number.

Respectfully submitted,

DATE: July 29, 2002

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Appendix

Amendments to the Claims

1. (amended) A process for producing a magnetic recording medium which comprises:

applying a non-magnetic layer coating material onto a non-magnetic support and drying the coating material to form a non-magnetic layer, and then

applying a magnetic layer coating material more excessively than an intended magnetic layer-wet thickness onto the non-magnetic layer by using a die nozzle coating followed by scraping excess amounts of the magnetic layer coating material to the intended magnetic layer-wet thickness by means of a wire bar or a non-wire coater bar in which a channel is formed thereon to form a magnetic coating layer.

5. (new) The process for producing the magnetic recording medium according to claim 1, wherein the magnetic recording medium has the magnetic layer with a dry thickness of 0.02 to 0.08 μm.

6. (new) The process for producing the magnetic recording medium according to claim 1, which comprises curing the non-magnetic layer after drying the non-magnetic layer coating material.

7. (new) A process for producing a magnetic recording medium which comprises:

applying a non-magnetic layer coating material onto a non-magnetic support and drying the coating material to form a non-magnetic layer followed by curing the non-magnetic layer, and

then

applying a magnetic layer coating material more excessively than an intended magnetic layer-wet thickness onto the non-magnetic layer by using a die nozzle coating followed by scraping excess amounts of the magnetic layer coating material to the intended magnetic layer-wet thickness by means of a bar to form a magnetic coating layer.

8. (new) The process for producing the magnetic recording medium according to claim 7, wherein 2 to 20 times as large amounts of the magnetic layer coating material as the intended magnetic layer-wet thickness is applied onto the magnetic layer by using the die nozzle coating.

9. (new) The process for producing the magnetic recording medium according to claim 7, wherein a solid component concentration of the magnetic layer coating material is 10% by weight or less.

10. (new) The process for producing the magnetic recording medium according to claim 9, which comprises dispersing the magnetic layer coating material again by means of an online dispersion apparatus immediately before applying the magnetic layer coating material onto the non-magnetic layer.